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AUTHOR Pellegrini, Anthony D.
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ABSTRACT

This study examined a model suggesting that personal variables (age and gender) and environmental variables (activity centers) affect social-cognitive aspects of children's play. A total of 80 children (32 boys and 48 girls) participated. Same-age and same-gender dyads from each of two age groups (4- and 5-year-olds) were observed playing in an experimental playroom. On two occasions, children played in a dramatic center and on two occasions in a blocks center. Social-cognitive aspects of play were scored according to a time-sampling procedure and were concurrently scored on a nested social-cognitive matrix with an additional listing for onlooking, unoccupied, and rough-and-tumble behaviors. Results were compatible with those suggested by the model. Specifically, play generally followed the themes suggested by the props in each of the two centers. Predicted age effects were supported to the extent that play became more complex with age. Gender interacted with age and activity center to cause variation in play. Main effects due to gender were, however, unreliable. Results were considered significant in that they document the main and interactive effects of personal and controlled environmental variables on preschoolers' play behaviors.
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Children's social-cognitive play behavior: The effects of age, gender, and activity centers*

Anthony D. Pellegrini
Institute for Behavioral Research
University of Georgia

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Abstract

The intent of the study was to examine a model suggesting that personal (age and gender) and environmental (activity centers) variables affect social-cognitive aspects of children's play. Same-age and same-gender dyads from each of two age groups (four- and five-year-olds) were observed playing in an experimental playroom. On two occasions children played in a dramatic center and on two occassions in a blocks center. Results were compatible with the model. More specifically, play was affected by the center in which children played to the extent that their play generally followed the themes suggested by the props in those centers. Predicted age effects were supported to the extent that play became more complex with age. Gender interacted with age and activity center to cause variation in play. Main effects due to gender, however, were unreliable. These results are significant in that they document the main and interactive effects of personal and controlled environmental variables on preschoolers' play behaviors.

Children's social-cognitive play behavior:

The effects of age, gender, and activity centers

Recently, researchers have utilized the categories suggested by Smilansky (1968) and Parten (1932) to describe social-cognitive aspects of children's play (e.g., Johnson & Ershler, 1981; Rubin, Maioni, & Hornung, 1976). Investigations concerning causes of variation in play behaviors may be aided by the Lewinian (1931) model that play is a function of personal and environmental variables. The personal variables typically observed have been children's age and gender. The environmental variables examined are more varied. For example, researchers have suggested that play varies in accord with the particular activity center in which children are observed (e.g., Rubin & Siebel, 1979; Vandenberg, 1981). The number of students and adults in classrooms or in activity centers are other environmental variables which have been shown to relate to variation in social-cognitive aspects of children's behavior (O'Connor. 1975; Pellegrini, 1983; Smith & Connolly, 1980).

Most researchers who have examined relations among personal, environmental and social-cognitive variables have utilized observational paradigms (e.g., Emmerick, 1977). Children's interactions have typically been observed during their free play time in their preschool classrooms. Inferences concerning the effects of individual activity centers, age, and gender on play have been based on observations of the social-cognitive behaviors of boys and girls of different ages. Results of these studies suggest a number of things. First, boys and girls prefer to play in different centers (Connor & Serbin, 1977); e.g., boys, more than girls, prefer to play with vehicle toys and in water/sand centers (Rubin & Siebel, 1979). Second, presence in certain activity centers relates to specific forms of

social-cognitive play, e.g., presence in art centers relates significantly and positively to solitary- and parallel-constructive play (Rubin & Siebel, 1979). Third, with age children's play becomes more social (Pellegrini, 1982) and moves from constructive to dramatic (Rubin & Krasnor, 1980; Smilansky, 1968). Other researchers have shown that the number of students and adults present in a classroom relates differentially to social-cognitive aspects of play. Regarding number of students present, children in small peer groups, rather than large peer groups, tend to engage in interactive-dramatic play (Smith & Connolly, 1980). The number of adults present in a classroom (O'Connor, 1975) and in individual activity centers also relate differentially to the forms of play children exhibit (Pellegrini, 1983).

Those researchers examining the effects of activity centers on play have not accounted for possible variation in play due to the number of participants in those centers. Similarly, those examining the effects of the number of participants on children's play have not considered possible variation in children's play due to the center in which children were observed. As a result, these environmental variables, activity centers and numbers of participants in the centers, are typically confounded. In order to separate the effects of these variables the researcher must control the number of participants in each center.

It has also been suggested that children's individual differences, such as gender, affect social-cognitive aspects of play (Rubin, Fein, & Vandenberg, 1983). More specifically, children in free play settings go to certain activity centers because of sex-role preferences (Eisenberg, in press). As a result, the behavior that they exhibit in those centers may not be due to the activity centers per se. The behaviors observed in those centers may be

characteristic of the children choosing to play in those centers. Thus, the behaviors observed in specific centers may better reflect the characteristic behaviors of children preferring to play with the materials in those centers, not the centers per se. As noted above, research does indeed suggest that gender relates to the types of centers in which preschoolers prefer to play (Connor & Serbin, 1977; Rubin & Seibel, 1979). Thus, when children are free to choose centers, as they are in most observations of free play, the effect of activity centers becomes further confounded with children's gender-related preferences for centers.

Another intent of this study was to examine age-related play trends with older, middle-class, preschoolers in experimental settings. The observational work suggests that preschoolers' play becomes more social and more dramatic across the preschool period (Rubin et al., 1983). We attempted to replicate these results in an experimental setting.

To summarize, researchers have attempted to document the effects of personal (age and gender) and environmental (activity centers and number of participants) variables on social-cognitive aspects of preschoolers' play. They have generally found that play varies in accord with these variables. In these observational studies, however, the personal and environmental variables are typically confounded. Thus, in the present study we controlled the number and gender (same-age and same-gender dyads) of the children interacting in two centers and the number of adults present (zero) in the centers. Further, all dyads played in each of two specified activity centers on two occasions. Consequently, any effects due to individual preference for a play context were controlled. In essence, this study tested the Lewinian (1931) model that behavior varies as a function of personal and environmental factors. We

hypothesized that personal and environmental variables would cause significant variation in social-cognitive aspects of play. We were interested in the ways in which these variables affected the individual categories and subcategories of the social-cognitive aspects of play. We hypothesized that children's play would vary as a function of each activity center and that play would become more social and more dramatic with age.

Methods

Subjects

Eighty children, 32 boys and 48 girls, were involved in this study. The sample was drawn from preschools in a small southern city. All schools served predominantly middle-class families. Dyad lists of same-age (not more than two months difference in age) and same-gender children were constructed from age-graded classrooms. The children from the younger classrooms had an average age of 50.31 months (*SD* = 3.21) and the children from the older classrooms had an average age of 62.04 months (*SD* = 4.05).

Setting

The children were observed in experimental playrooms, of equal spatial density, in their preschools. Children's behavior was recorded with a non-obtrusive videocamera. For the dramatic context, the following props were set out on a 2.5' x 3' table: two doctors' kits, two dolls, two smocks, blankets, and pill bottles. For the block context, the following props were set out on the same table: wooden and colorful plastic blocks of various sizes, numerous styrofoam shapes, and pipe cleaners. The specific props for the dramatic and blocks contexts were chosen because they represented high and

low structure objects, respectively (Pulaski, 1973).

Procedure

A male or female experimenter escorted each of the sampled dyads to the experimental playroom for the four separate observations. The experimenter left the play area and entered an adjacent observation area to record their behavior. Each dyad was observed for four separate sessions of approximately twenty minutes each sessions, twice in the constructive play center and twice in the dramatic play center. The order of observations was counterbalanced. In the 12 cases in which dyads were unwilling to play for the full twenty minute period, they were taken back to their rooms before the period was over. Children typically wanted to leave playrooms to go to the restroom.

Social-cognitive aspects of children's play were scored according to a time-sampling procedure. Following Johnson and Ershler (1981), each member of the dyad was scored at predetermined and alternating one-minute intervals. Only play behaviors sustained for 15 seconds were scored. To equalize the amount of observed time across dyads, only the first 14 observations per dyad were coded and analyzed. All dyads played at least 14 minutes; there were seven observations for each dyad member for each session. Each dyad had 14 observations within each of the four sessions, for a total of 56 observations.

Scoring

Social and cognitive aspects of children's behavior were concurrently scored on the nested social-cognitive matrix with an additional listing for onlooking, unoccupied, and rough-and-tumble. The following categories, following Rubin, Maioni, & Hornung (1976) and Smilansky (1968), comprised the cognitive measures: functional - repetitive motor activities; constructive -

use of objects to build something; dramatic - transforming a real situation into an imaginary situation. Social categories, following Parten (1932), Rubin et al (1976) and Johnson and Ershler (1981) included: solitary - playing alone; parallel - playing near, but not with, others; and interactive - interacting with peers in a common enterprise. In addition, the following social subcategories were added: onlooker - an unengaged child observing another child; unoccupied - an unengaged child not seeking social attention, e.g., looking out a window; rough-and-tumble included shoving, hitting, and chasing (Smith & Connolly, 1980).

There were individual scores for each of the nested social-cognitive subcategories. However, interactive-functional behavior was not included in the matrix by nature of the definition: functional play cannot be interactive (Rubin et al., 1976). In addition, individual subcategory scores for onlooker, unoccupied, and rough-and-tumble were calculated. There were also aggregate social (i.e., separate scores for each of the solitary, parallel, and interactive categories) and aggregate cognitive (i.e., separate scores for each of the functional, constructive, and dramatic categories) scores.

The unit of analysis was the dyad. That is, social-cognitive scores from both children in the dyad were collapsed and considered one score for the dyad in each of the four observations. Frequency scores for each subcategory and aggregate categories were analyzed.

Interrater agreement for the scoring of the observational categories was established by having two observers independently view the videotapes of five dyads interacting in two settings - twice with blocks and twice with dramatic props. They scored 56 incidents of behavior for five dyads. The mean interrater agreement, across all categories, was 92%. No agreement for a

category fell below 87%. These statistics represent the number of agreements divided by agreements plus disagreements.

Design

Age and gender were between subject variables and play context was the within subject variable. Data were analyzed in two stages: First, with a 2(age) x 2(gender) x 2(context) multivariate analysis of variance (MANOVA), utilizing Wilks' criterion. MANOVA was used to control for statistical dependencies among the dependent variables and to assess main and interactive effects of the independent variables on the social-cognitive aspects of play as a totality. The second stage of analysis utilized 2(age) x 2(gender) x 2(context) repeated measures analysis of variance (ANOVA) on each of the social-cognitive subcategories and aggregate categories. There were a total of 17 dependent measures: three aggregate social (solitary, parallel, and interactive) and three aggregate cognitive (functional, constructive, and dramatic) categories, eight social-cognitive subcategories (e.g., solitary-functional or interactive-dramatic), and three additional subcategory social measures (onlooking, unoccupied, and rough-and-tumble). Planned comparisons on significant main effects, differences between repeated measures, and interactions were calcuated according to Scheffe's procedure, at the .05 level.

Results

The descriptive statistics for social-cognitive aspects of play for four- and five-year-olds of both sexes, in both activity centers, are displayed in

/Table 1 about here/

Table 1. Results reporting effects due to personal (age and gender) and environmental (activity centers) variables and interactions among them will be reported, in turn. The results of the MANOVA indicated that these variables did affect the social-cognitive aspects of play as a whole. More specifically, main effects were observed for age, Wilks' Lambda = .41, F (12, 25) = 3.00, $p < .009$, and context, Wilks' Lambda = .15, F (12, 25) = 11.33, $p < .0001$. Interactive effects were observed between age and gender, Wilks' Lambda = .48, F (12, 25) = 2.24, $p < .04$; age and context, Wilks' Lambda = .48, F (12, 25) = 2.19, $p < .04$; and among age, gender, and context, Wilks' Lambda = .43, F (12, 25) = 2.69, $p < .01$. Thus, results were compatible with the Lewinian model.

Personal variables: Age effects

Significant main effects for age were observed on all three of the cognitive categories, on one of the three social categories, and on four of the 11 subcategories. Generally, younger children engaged in functional, constructive, and solitary play while older children engaged in dramatic play. As can be seen in Table 1, four-year-olds, more than five-year-olds, engaged in the following forms of play: functional, F (1, 36) = 6.42, $p < .01$; constructive play, F (1, 36) = 5.38, $p < .02$; and solitary behavior, F (1, 36) = 8.49, $p < .006$. Five-year-olds, however, engaged in significantly more dramatic play, F (1, 36) = 6.75, $p < .01$.

There were age differences for four of the social-cognitive subcategories. Within solitary play, four-year-olds exhibited significantly more solitary-functional, F (1, 36) = 4.28, $p < .04$, and solitary-constructive play, F (1, 36) = 13.56, $p < .0008$, than five-year-olds. For parallel-functional play, the younger children also demonstrated significantly more than the older children, F (1, 36) = 4.13, $p < .04$. The five-year-olds, however, exhibited significantly more interactive-dramatic play than the four-year-olds, F (1, 36) = 6.14, $p < .01$.

Personal variables: Age x gender interactions

Effects due to gender alone were not reliable, as indicated by the MANOVA. Age x gender interactions were, however, reliable. Repeated measures ANOVAs revealed significant age x gender interactions on two social categories, one cognitive category, and on three subcategories. Four-year-old girls exhibited significantly more parallel play than four-year-old boys, but five-year-old boys exhibited significantly more than five-year-old girls, F (1, 36) = 20.07, $p < .0001$. Regarding the social category, interactive play, F (1, 36) = 39.97, $p < .0001$, and the cognitive category, dramatic play, F (1, 36) = 25.56, $p < .0001$, four-year-old boys exhibited more than four-year-old girls, whereas five-year-old girls exhibited more than five-year-old boys.

There were significant age x gender interactions on three subcategories. In parallel-functional play, four-year-old girls exhibited significantly more than four-year-old boys, F (1, 36) = 10.58, $p < .0002$. For rough-and-tumble play, however, four-year-olds boys exhibited significantly more than four-year-old girls, F (1, 36) = 8.00, $p < .007$. Interactive-dramatic play was the last subcategory for which a significant age x gender interaction was observed, F (1, 36) = 30.34, $p < .0001$; four-year-old boys engaged in

significantly more than four-year-old girls but older girls exhibited more than older boys.

Environmental effects

Main effects due to the environmental variable, activity centers, were observed on all three cognitive categories and on seven subcategories. Generally, these results suggest that children engaged in constructive play in the blocks context and in functional and dramatic play in the dramatic context. More specifically, the dramatic context elicited significantly more functional, F (1, 36) = 12.46, $p < .001$, and dramatic play, F (1, 36) = 69.79, $p < .001$, than the block context. Blocks elicited significantly more constructive play, F (1, 36) = 102.08, $p < .0001$.

The context effects were consistent across all subcategories. The blocks context, significantly more than the dramatic context, elicited: solitary-constructive, F (1, 36) = 17.60, $p < .0002$; and parallel-constructive play, F (1, 36) = 38.23, $p < .0001$. The dramatic context, in turn, elicited significantly more: solitary-functional, F (1, 36) = 8.61, $p < .007$; parallel-functional, F (1, 36) = 9.72, $p < .003$; and interactive-dramatic play, F (1, 36) = 5.44, $p < .02$.

Personal x environmental interactions

The MANOVA indicated that the following interactions were reliable: Age x context and age x gender x context. Results of ANOVAs on these interactions will be reported, in turn.

Significant age x context interactions were observed for two subcategories: solitary-functional play, F (1, 36) = 7.98, $p < .007$, and unoccupied behavior, F (1, 36) = 5.51, $p < .02$. In both cases, age

differences were observed only in the blocks context; younger children exhibited significantly more of both types of behavior than older children.

Significant three-way interactions, among age x gender x context, were observed for two of the three cognitive categories and for two of the 11 subcategories. These interactions were examined in terms of gender differences within each age group and within each context. The interaction for the parallel-constructive subcategory indicated that in the dramatic context four-year-old boys exhibited significantly more parallel- constructive play than four-year-old girls, F (1, 36) = 10.90, $p < .002$. In terms of the onlooker subcategory in the blocks context, five-year-old boys exhibited more onlooker behavior than same age girls, F (1, 36) = 7.91, $p < .007$.

Regarding the two cognitive categories affected by the three-way interactions, significant variation was observed only in the blocks context. Five-year-old girls exhibited significantly more functional play than five-year-old boys, F (1, 36) = 5.97, $p < .01$. The younger girls exhibited significantly more constructive play than the younger boys, F (1, 36) = 12.10, $p < .001$.

Discussion

As stated in the introduction, Lewin (1931) and others (e.g., Emmerick, 1977) have proposed a useful model to describe children's behavior in classroom-like settings. In the present study we tested this model experimentally by manipulating personal (age and gender) and environmental (activity centers) variables. The results of the MANOVA were compatible with the model. Another intent of the study was to examine ways in which the personal and environmental variables affected aggregate categories and

subcategories of the social-cognitive aspects of play.

Activity centers did affect children's play. Generally, children engaged in functional and dramatic play in the dramatic context and in constructive play in the blocks context. Although, the blocks center did elicit dramatic play, more of it was elicited in the dramatic center. These findings differ somewhat from the observational work of Rubin and Siebel (1979). They found that when groups of preschoolers were observed in the blocks center of their preschool, their play was predominantly dramatic. However, the findings of the present study are consistent with other experimental work. For example, Pulaski (1973) found that when children's preference for toys was controlled, they engaged in dramatic play with costumes and in constructive play with blocks.

The results of the present study, and of other experimental findings (e.g., Pulaski, 1973), support the thesis that observational research describing children's play in activity centers may be actually describing the behavior of children who choose to play in those centers, not the behaviors elicited by the centers. When preference for a center is controlled, children's play tends to adhere to the themes suggested by the materials in the centers.

One of the individual differences reported in the literature as affecting children's play and preference for specific play contexts is gender. Gender alone did not have a reliable effect on play behaviors. The paucity of gender effects may have been due to the sex-role contingencies of the experimental activity centers. Recent work on young children's sex-roles indicates that children often exhibit sex-stereotyped play behaviors when they are placed in contrived settings (Eisenberg, in press). That is, young children will play

in sex-stereotypic ways in the presence of same-gender peers or adults. This is particularly true when the groupings are in experimental, or contrived, settings. They may exhibit stereotypic behavior here, even though the behaviors may not be their preferred behaviors, because children are typically rewarded for doing so (Eisenberg, in press).

Gender did, however, interact significantly with both age and age and activity center. The gender by age interaction indicated that four-year-old boys engaged in more interactive and dramatic play than same age girls and that the younger girls engaged in more parallel play than the younger boys. These trends were reversed for the five-year-olds. Four-year-old data are consistent with previous observational work involving similar age children (e.g., Johnson & Ershler, 1981; Rubin et al, 1976). The five-year-old results are not consistent with the literature, however.

The often inconsistent gender differences in the children's play literature are probably due to specific setting factors, such as different activity centers and different contextual contingencies (Eisenberg, in press; Fein, 1981). In the present study reliable gender difference tended to occur only in the blocks context. Girls tended to engage in more functional and constructive play with blocks than did boys; no gender differences were observed for the amount of dramatic play in that center. Thus, gender differences were only observed for those girls playing with blocks at a cognitively less sophisticated level (i.e., functionally and constructively rather than dramatically). These results can be explained in at least two ways. First, the relative unfamiliarity of girls with blocks, as compared to boys, may have caused them to engage in less complex forms of play (Fein, 1981). The second, and preferred, explanation is that girls may have played

with the blocks in less sophisticated ways because they were grouped with another girl in a typically masculine context (Connor & Serbin, 1977; Eisenberg, in press). The girls may have thought that the context (i.e., masculine toys, same-sex partner and a contrived situation) demanded feminine behavior (i.e., less sophisticated block play).

Lastly, we examined the effect of age on social-cognitive aspects of play. Data from the present study, like other studies (e.g., Parten, 1932; Pellegrini, 1982; Rubin et al., 1976; Smilansky, 1968), found younger preschool children's play to be less social and less dramatic than older children's play.

In conclusion, this study extended the literature on variables affecting play. First, it was shown that in experimental settings, unlike naturalistic settings, children's play followed the themes suggested by the centers. Age results replicated previous observational work. Most importantly, this study indicated that gender differences were unreliable. This finding may have been due to the specific gender-related contingencies of the activity centers used in this study.

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TABLE 1

MEANS AND STANDARD DEVIATIONS FOR

PLAY CATEGORIES BY SETTING BY AGE BY GENDER

	BLOCKS								DRAMATIC							
	4 year olds				5 year olds				4 year olds				5 year olds			
	Male		Female		Male		Female		Male		Female		Male		Female	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Solitary	.90	(1.56)	1.75	(.92)	.15	(1.16)	.57	(1.35)	1.33	(2.25)	1.37	(1.28)	.25	(3.02)	.58	(.79)
Functional	.08	(.23)	.25	(.46)	.15	(.35)	.08	(.28)	.50	(.67)	.75	(1.03)	.25	(.46)	.25	(.62)
Constructive	.66	(.88)	1.25	(.70)	.00	(.00)	.33	(.65)	.08	(.28)	.12	(.35)	.00	(.00)	.00	(.00)
Dramatic	.16	(.39)	.25	(.31)	.00	(.00)	.16	(.33)	.75	(1.01)	.50	(.65)	.00	(.00)	.33	(.70)
Parallel	2.41	(1.56)	4.87	(2.58)	4.37	(2.38)	2.25	(2.09)	3.08	(1.97)	5.00	(3.02)	4.50	(3.66)	2.33	(1.92)
Functional	.41	(.51)	.50	(.75)	.37	(.51)	.00	(.00)	.33	(.65)	1.62	(1.50)	.75	(1.03)	.50	(.90)
Constructive	1.41	(1.24)	3.75	(2.96)	2.75	(2.49)	1.00	(1.41)	.16	(.38)	.12	(.35)	.12	(.35)	.16	(.38)
Dramatic	.58	(.90)	.62	(.91)	1.25	(1.38)	1.25	(1.54)	2.58	(2.23)	3.25	(2.49)	3.62	(3.37)	1.66	(1.87)
Interactive	5.58	(2.66)	3.74	(3.48)	3.75	(2.77)	6.16	(1.85)	4.25	(3.23)	3.24	(1.58)	3.49	(2.61)	7.41	(2.31)
Constructive	1.33	(1.37)	1.87	(1.35)	1.25	(1.38)	1.16	(1.46)	.00	(.00)	.12	(.35)	.12	(.35)	.50	(.79)
Dramatic	4.25	(1.48)	1.87	(2.58)	2.50	(3.02)	5.00	(2.86)	4.25	(2.56)	3.12	(1.12)	3.37	(2.77)	6.91	(2.77)
Functional	.49	(.79)	.75	(1.03)	.52	(.75)	.08	(.86)	.83	(.83)	2.37	(2.10)	1.00	(1.35)	.75	(1.20)
Constructive	3.41	(2.06)	6.87	(2.53)	4.00	(2.77)	2.50	(2.54)	.25	(.62)	.37	(.74)	.25	(.46)	.66	(.98)
Dramatic	5.00	(1.41)	2.75	(2.05)	3.75	(3.91)	6.41	(2.15)	7.58	(2.57)	6.87	(2.69)	7.00	(3.92)	8.91	(2.06)
Unoccupied	.08	(.28)	.25	(.46)	.00	(.00)	.00	(.00)	.00	(.00)	.00	(.00)	.12	(.35)	.00	(.00)
Onlooker	1.41	(1.44)	.50	(.53)	.62	(.91)	.66	(.98)	.66	(1.15)	.87	(1.45)	2.00	(2.39)	.50	(.67)
Rough-Tumble	1.00	(1.53)	.12	(.35)	.75	(1.48)	.16	(.38)	1.33	(1.55)	.00	(.00)	.00	(.00)	.25	(.45)